

WHAT IS CLAIMED IS:

1. A high efficiency optical feedback modulator operable to produce a high modulation depth optical signal, comprising:

an optical modulator having a first and a second optical input and a first and a second optical output;

an optical feedback system coupling the second optical output to the second optical input and operable to communicate an optical feedback signal from the second optical output to the second optical input; and

wherein the first optical input is operable to receive an input light beam and the optical modulator operates to modulate the input light beam and the optical feedback signal in response to an electrical signal to output the high modulation depth optical signal from the first optical output.

2. The high efficiency optical feedback modulator of Claim 1, wherein the optical feedback system includes an optical amplifier disposed between the second optical output and the second optical input.

3. The high efficiency optical feedback modulator of Claim 1, wherein the optical feedback system comprises an optical waveguide.

4. The high efficiency optical feedback modulator of Claim 1, wherein the electrical signal comprises an analog signal.

5. The high efficiency optical feedback modulator of Claim 1, wherein the optical modulator further comprises a first and a second 3dB coupler.

6. The high efficiency optical feedback modulator of Claim 1, wherein the optical modulator further comprises a first and a second phase modulator.

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7. The high efficiency optical feedback modulator of Claim 1, wherein the high efficiency optical modulator is disposed within an optical repeater.

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8. A high efficiency optical feedback modulator comprising:
an optical modulator having at least two optical inputs and at least two optical
outputs; and
an optical feedback system coupling at least one of the optical outputs to at least
one of the optical inputs.

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9. The high efficiency optical feedback modulator of Claim 8, wherein the
optical modulator comprises a Mach-Zehnder two-by-two optical modulator comprising a
first and second optical input, and a first optical output that is the complement of a
second optical output, and wherein the feedback system couples the second optical output
to the second optical input.

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10. The high efficiency optical feedback modulator of Claim 8, wherein the
optical feedback system includes an optical amplifier disposed between said at least one
of the optical outputs and said at least one of the optical inputs.

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11. The high efficiency optical feedback modulator of Claim 8, wherein the
optical feedback system comprises an optical waveguide.

12. The high efficiency optical feedback modulator of Claim 8, wherein the
optical modulator comprises a first and a second phase modulator.

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13. The high efficiency optical feedback modulator of Claim 8, wherein the
high gain optical feedback modulator is disposed within an optical repeater.

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14. A fiber optic system comprising:
a high efficiency optical feedback modulator operable to receive an electronic input signal and intensity modulate an input light beam with the electronic input signal to produce a high modulation depth optical signal, the high efficiency optical feedback modulator comprising:
an optical modulator having at least two optical inputs and at least two optical outputs; and
an optical feedback system coupling at least one of the optical outputs to at least one of the optical inputs;
an optic fiber coupled to an optical output of the optical modulator and operable to communicate the high modulation depth optical signal; and
an optical receiver operable to receive the high modulation depth optical signal and convert the high modulation depth optical signal into an electronic output signal.
15. The fiber optic system of Claim 14, wherein the optical feedback system comprises an optical amplifier disposed between said at least one of the optical outputs and said at least one of the optical inputs.
16. The fiber optic system of Claim 14, wherein the optical modulator comprises a Mach Zehnder two-by-two optical modulator.
17. The fiber optic system of Claim 14, wherein the electronic input signal comprises an analog signal.
18. The fiber optic system of Claim 14, further comprising an originating system operable to produce the electronic input signal, and a destination system operable to receive the electronic output signal.
19. The fiber optic system of Claim 18, wherein the originating system

comprises a cable television system and the destination system comprises a user distribution system.

20. The fiber optic system of Claim 18, further comprising at least one high gain optical repeater disposed in-line with the optic fiber.

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21. A method for producing a high modulation depth optical signal comprising:

communicating an input light beam to a first optical input of an optical modulator;

communicating an optical feedback signal from a second optical output of the optical modulator to a second optical input of the optical modulator;

coupling the input light beam with the optical feedback signal to produce a first and a second optical signal;

intensity modulating at least one of the optical signals with an electronic input signal to produce a first and a second phase shift optical signal; and

coupling the phase shift optical signals to produce the high modulation depth optical signal and the optical feedback signal.

22. The method of Claim 21, further comprising the step of amplifying the optical feedback signal prior to communicating the optical feedback signal to the second optical input of the optical modulator.